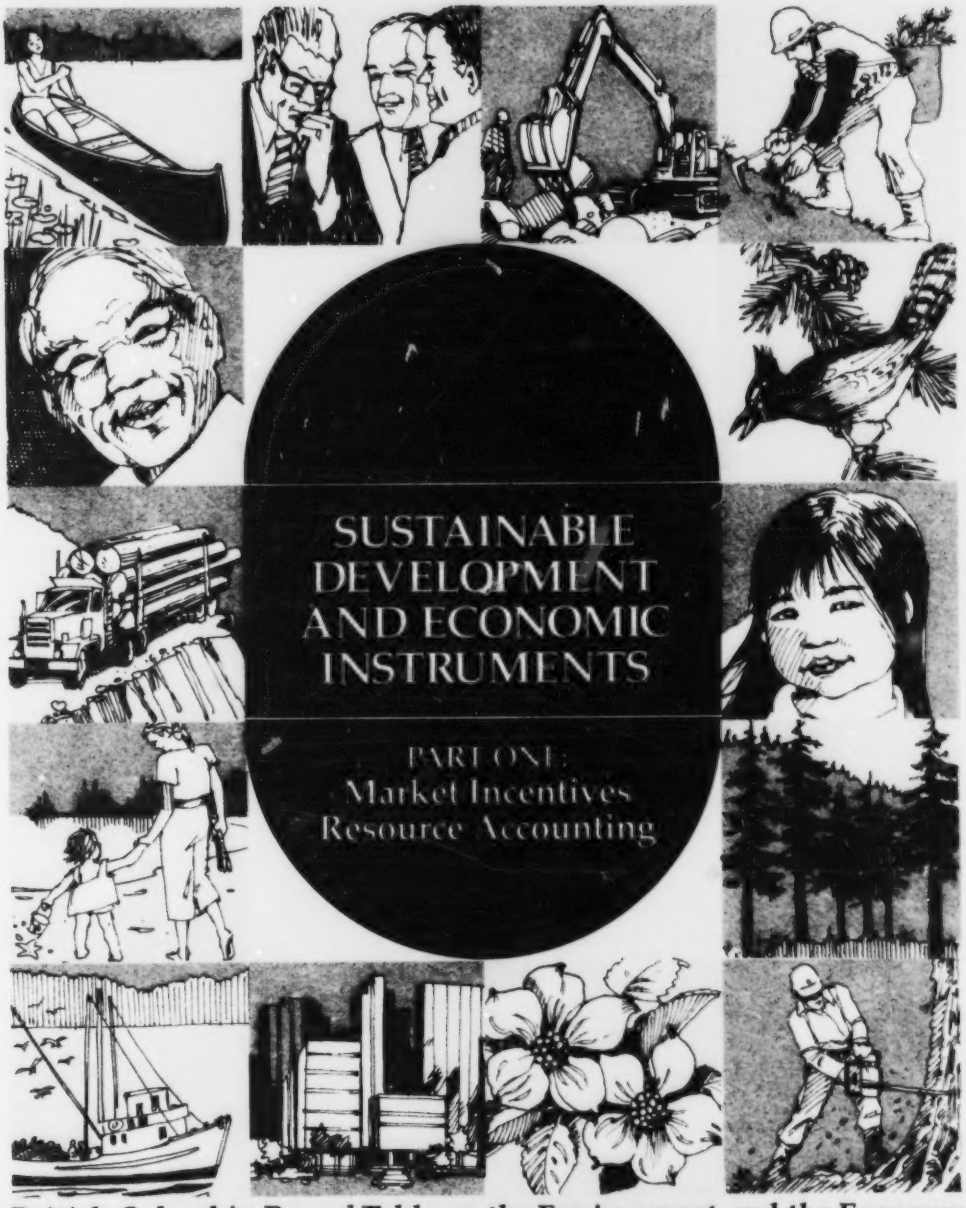

SUSTAINABLE DEVELOPMENT AND ECONOMIC INSTRUMENTS

PART ONE: Market Incentives Resource Accounting

British Columbia Round Table on the Environment and the Economy

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Part One:
Market Incentives
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ROUND TABLE

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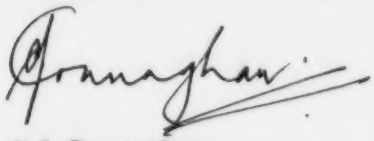
PREFACE

Sustainable Development and Economic Instruments, Part One: Market Incentives, Resource Accounting is a theme paper developed by the British Columbia Round Table on the Environment and the Economy. Its content reflects a consensus by the Round Table members on a number of major issues and options related to economic instruments that support sustainable development.

This paper is intended to stimulate public discussion on the elements of a Sustainable Development Strategy for British Columbia. It is hoped that **Sustainable Development and Economic Instruments, Part One: Market Incentives, Resource Accounting** will provide a starting point for dialogue and will assist in determining the goals and values held by the public. The ensuing dialogue may reveal other appropriate issues to be addressed by the Round Table. **Sustainable Development and Economic Instruments, Part One: Market Incentives, Resource Accounting** is a companion to the Round Table's document **A Better Way**.

The Round Table welcomes your views and advice on this and other subjects related to a sustainable development strategy for British Columbia.



C.J. Connaghan
Chairman

INTRODUCTION

The Round Table is focusing on three major themes in the effort to develop a sustainable development strategy - energy, communities, and land and water. The concept of economic instruments is a common thread running through all of these subjects and is often referred to in the international literature on sustainable development. Economic instruments are tools that might help create a stronger link between the economy and the environment, and help in the implementation of a sustainable development strategy. In the carrot vs the big stick analogy, economic instruments are often likened to the carrot as they promote positive action initiated by the consumer or the producer, rather than the big stick of regulations and fines imposed by government.

Sustainable Development and Economic Instruments, Part One: Market Incentives, Resource Accounting, along with its accompanying background papers[1] is intended to outline the various economic instruments that might be used in moving toward sustainability. The Round Table suggests that there are three types of economic instruments that can promote sustainable development: market incentives, resource accounting, and resource valuation.

Market incentives includes taxes and prices and the creation of market-like institutions. All of these incentives are intended to encourage sustainable development. *Resource accounting* is a way to keep track of the state of B.C.'s natural resources. *Resource valuation* is measuring the value of environmental assets that are not usually included in economic decision making and will be explored in **Sustainable Development and Economic Instruments, Part Two: Resource Valuation**.

This theme paper is intended to summarize the key issues associated with market incentives and resource accounting, and outline the steps that could be taken to implement them. Experience in other jurisdictions has shown that some of these techniques are controversial. Nevertheless, because the need to better reflect environmental concerns in economic choices is so great, and because the options available are sufficiently innovative, we feel that some should be implemented on an experimental basis soon. In addition, efforts to develop long term research programs leading to consensus on methods and implementation should be made within the next few years.

As with all of the Round Table's theme papers, the intention of this document is to encourage dialogue with the public as part of the process of building a sustainable development strategy for British Columbia. Please refer to the appendix at the end of the paper for information about how you can contact the Round Table.

[1] Round Table on the Environment and the Economy, **Economic Measures for Integrating the Environment and the Economy**, and **Incorporating Environmental Performance Indicators into National Income Accounts**, 1991.

THE CHALLENGE

"The health of our environment and the strength of our economy are interdependent. The long term sustainability of our society requires that these vital elements be managed in harmony." [2]

The environment and its social and biological values must be brought into the sphere of society's decision making. One of the key lessons learned from the writing on sustainable development is the need to better integrate environmental concerns into economic decisions. Currently in B.C. the yardstick by which we measure how we are doing is an economic indicator called gross domestic product (GDP). GDP is really a statement of cash flow that can be described as consumer, government, investment, export and import spending. However, as a society we are not using economic accounting to keep track of our environmental assets or to encourage sustainable development.

Economic incentives appeal to people's instincts to do things that cost the least. Currently in B.C. there are several examples of initiatives where we have used this instinct to move towards more sustainable behaviour. Pop bottles and beer bottles are returned to the store because it is less expensive than throwing them out. One of the reasons people have started to use diaper services and cloth diapers is because disposable diapers are now more expensive. Both these examples show how behaviour can be shifted using economic incentives. These examples only show one type of market incentive - pricing. There are many different types of market incentives that are available and could be used to encourage sustainable development in B.C.

The challenge then is how best to use economic instruments such as market incentives and resource accounting to encourage sustainable development. The use of these instruments is controversial. An example is the controversy around the use of tradeable pollution permits. Some see this as selling a right to pollute. The controversy is lessened in cases where the amount of pollution is being reduced.

[2] The Report of the British Columbia Task Force on the Environment and the Economy, **Sustaining the Living Land**, 1989, page 20.

MARKET INCENTIVES

In British Columbia in the 1990s we will need to use every tool available to us to promote sustainability. We will also have to use those tools as effectively as possible. One of the tools is the use of economic incentives to stimulate appropriate behaviour in relation to how we use natural resources.

The price of a product and the terms of access and ownership are perhaps the most important influences on market choices by consumers. Economists argue that the fundamental reason societies face environmental problems is because many natural resources such as air and water are not appropriately priced and sold in the marketplace. Thus, consumers have no incentive to conserve them and every incentive to overuse them, for purposes ranging from production processes to waste disposal.

To see the importance of incentives and prices, consider that the quickest way to create environmental changes in British Columbia, or anywhere else, might be to:

- significantly change the prices and terms under which access is provided to non-market natural resources such as air and water for waste disposal;
- change the prices and terms for access to publicly owned renewable resources such as forests and fisheries; and
- change the prices for energy resources.

Governments have not made sweeping changes in such prices because of the disruption that would occur in the economic system and related redistribution consequences. Nevertheless, the power of market-like incentives to affect environmental behaviour is enormous and creates efficiency in attaining environmental goals at least cost.

Greater reliance on economic incentives is seen as a major innovation in designing environmental policy because incentives can augment or replace typical command and control approaches to regulation such as deregulation and fines. Thus, incentives are not a rationale for reduced regulation, but are a new approach to achieve environmental goals. Incentives may be preferable because they allow more flexibility in meeting environmental objectives, encourage innovation, and minimize the cost of meeting regulations.

For example, in the United States tradeable pollution permits have been used to reduce pollution discharges while at the same time offering the dischargers significant flexibility in how to reduce pollution.

Three crucial questions must be addressed when contemplating the use of market-like incentives as a tool for environmental policy: What *objectives* are these policies intended to achieve? What *level* of incentives is appropriate, given the need to balance conflicting objectives? What particular *types* of incentives are appropriate in different contexts?

The objectives for such incentives should be to encourage sustainable resource uses by better reflecting the social costs associated with environmentally harmful practices, and to minimize adverse effects on the provincial economy in key sectors. These objectives could often conflict, and policy makers have to consider tradeoffs between them. There is no reliable single measure of the "right" level of incentive in a particular case.

There are three basic kinds of incentives to be considered:

(1) **Incentives associated with the excise or internal tax system and the fee system for waste permits for industrial facilities**. Consider the example of excise taxes on products that are difficult to dispose of safely. If an excise tax were placed on such items, consumers would be encouraged to adopt lower cost alternatives that involve fewer waste problems. Consumer response would in turn encourage replacing higher polluting with lower polluting industrial output. This type of measure was recently introduced for vehicle batteries, vehicle tires, and disposable diapers sold in British Columbia. Similarly, excise taxes on gasoline could be used to encourage, or even subsidize, a shift to cleaner alternate fuels such as natural gas.

Consider the waste permit system for industrial facilities. The provincial government currently charges an annual fee for these permits. But, by ensuring that the fee adequately reflected the quality and quantity of the discharge, we would encourage innovation that would replace technology with high environmental impact with newer technology with lower environmental impacts.

(2) **Incentives in the current prices for energy and access to natural resources in British Columbia**. Consider an example of electricity prices: by gradually raising electricity prices to the full cost of new supplies, residential and industrial consumers would receive incentives to minimize demand. Such change however, would alter the type of industry coming to B.C. Traditionally, low energy costs have been an incentive for energy intensive industry to locate in B.C. Similarly, the prices charged for access to provincial resources, such as timber and minerals, should reflect and in some cases may already reflect, the full environmental and social costs of harvesting those resources. For example, new mines in the province must post a bond before commencing operation that will ensure that the mining area is rehabilitated after the mine closes.

(3) **The potential for establishing market-like mechanisms that involve tradeable rights for allocating the rights to use scarce environmental resources such as air and water.** Consider, for example, an important export industry that is the source of some undesirable air pollution caused by smokestack emissions. The industry contains many firms, operating many plants of different vintages. The expenditure required to reduce a ton of smoke emissions differs greatly among the plants.

Now assume that the government wishes to reduce the industry's smoke emissions by one-half. The most extreme regulatory solution would require that each plant cut its emissions to an amount equal to one-half the industry average. In this case, much money would be spent on reducing emissions from those plants where the cost of reducing emissions is large, while less would be spent on plants where the cost of reducing emissions is low.

Now assume that instead of requiring each plant to meet the industry pollution average, the government issues transferable rights for emissions, equal in total to one-half the industry's present amount of pollution. It either sells, or gives, these rights to firms in the first instance and the rights are then saleable among firms. The price of the right to emit a ton of pollution will tend, in this example, to equal the industry's average cost of removing a ton of pollution. Firms whose costs of removing pollution are less than the industry average, and hence less than the price of the pollution right, will clean up. Firms whose costs of cleaning up exceed the industry average, and hence exceed the price of the pollution right,

will buy the rights and continue to pollute. The outcome is that the government's pollution-abatement targets of reducing total pollution by one-half will be met, but at the lowest possible cost to the industry.

Incentives such as these probably have the best chance of success where there is a clearly understood environmental problem, where the public understands that any revenues collected by government will be used to address the issue for which the tax or fee has been levied, and where the public agrees with the priorities established for addressing the list of issues. In this regard, it might be possible to encourage interest groups to help set funding priorities on how funds are spent to create environmental improvement in British Columbia. Such an incentive could be established through the provincial government's Sustainable Environment Fund, which is based on revenues from excise taxes and the permit system. All major provincial expenditures for new environmental improvements are taken from this fund, and the public could be asked to help government select environmental improvements that create the greatest overall benefits. It is important for stakeholders to realize that all environmental improvements cost money and that they may not provide significant benefits relative to other environmental improvements using the same money. Such a framework would encourage informed public debate on the priorities for environmental improvement spending in the province.

In the near term, it should be possible to pursue one or two initiatives in each of the three categories of incentives on a trial basis. The rationale for pursuing these options soon is that there is a strong need to make progress in these areas, however experience elsewhere indicates that such initiatives need careful design. The initiatives discussed below would provide feedback about such methods and begin to indicate the potential benefits.

Taxes and Fees. The provincial government has taken a number of steps in this area already, such as increases in the waste discharge permit fee system. Other measures are under consideration, such as an expanded deposit/refund system for beverage containers. Of course, any changes in taxes and fees to encourage environmental improvement must consider the administrative burden of new tax schemes and the constraints imposed by constitutional limits on the province's taxation powers. The province, for example, cannot alter federal taxes and duties. A move toward sustainability in that field will be up to the federal government.

Should the provincial government pursue new opportunities in this area?

Resource and Energy Prices. An interesting example is BC Hydro's recent application to the BC Utilities Commission to raise electrical rates to encourage conservation. That application was turned down by the Commission, in part because it had no basis of experience to draw upon regarding this rationale for a rate increase.

Does this question need reconsideration, along with similar ones involving energy prices?

Tradeable Permits. Tradeable permit schemes could be attempted for air emissions in the Lower Mainland, or other multi-industry communities where air quality is a problem. Alternatively tradeable permits could be used in a single province wide industry where discharges are targeted for major reductions over a specified period of time such as pulp mills.

Should development of such a system be considered in B.C.?

Raising the prices of permits, increasing excise taxes, and changing the prices of energy and natural resources are bound to increases costs in many sectors. That is, after all, the objective of the exercise. The intent of these measures is to encourage changes in behaviour as a result of these increases in cost. For example, the intention is that consumers would be able to purchase low polluting products at less cost than high polluting products and that firms would start using lower polluting, lower cost processes. Similarly, to save money, energy users would conserve energy rather than use more. The surprising success of the B.C. Hydro Power Smart program, especially the refrigerator buy-back program, is an example of this process.

In the longer term, there is a strong need to develop incentives that can be implemented on a wide basis. Attention will have to be turned to methods for assessing the appropriate tradeoffs between short term costs and environmental improvement.

Although incentives have the power to change behaviour quickly, they are not a quick fix. To make changes in incentives feasible, they must be palatable to those affected. There is a clear need to communicate the intent of these changes, and demonstrate how they will lead to better outcomes. There would likely be a variety of responses to these types of proposals. For example, groups may be strongly supportive of measures that would create market-like institutions involving tradeable rights that allow them more flexibility in how they meet future emission standards. Conversely, there is likely to be a variety of reactions among environmental groups. In addition, social concern groups may be disturbed about the effects of such pricing on fixed-income groups.

In the United States, some leading environmental groups, such as the Natural Resources Defence Fund, strongly favour a tradeable permit approach; other groups see tradeable permits as "selling the right to pollute" and morally unacceptable. To be successful, it would be necessary to communicate that market-like incentives are fair because they involve placing market-like values on resources that have been treated as free in the past; that they are effective because they are the quickest means of creating environmental improvement; and that they are efficient in that they encourage industry to meet environmental standards at least cost.

RESOURCE ACCOUNTING

There is general agreement that environmental, social, and economic objectives should be integrated, but the process by which society measures economic and environmental values clearly needs definition.

The most commonly used measure of economic performance is Gross Domestic Product or GDP, which can be defined as the total unduplicated value of production that takes place within a geographical area. GDP is based on the concept of value added, which is defined as the difference between the value of total output and the costs of the inputs that are used in production.

Gross Domestic Product statistics, however, are a relatively limited measure of overall public performance. A simple example will illustrate this point: The grounding of the Exxon Valdez caused the worst oil spill in North American history and one of the worst the world has ever known. Miles of shoreline were contaminated and the damage to marine life and the overall environment was massive. But, ironically, this oil spill created an economic boom in Alaska. The gross domestic product of Alaska took a sharp surge **upwards** because of all the money spent trying to clean up the oil spill and because the effects of the spill on the natural resource base were not considered. Despite the environmental damage, in GDP the oil spill shows as an economic gain.

It is suggested that we devise rational standards by which to measure the environmental values along with the economic ones. Thus, economists and others interested in measuring societal performance have for years urged expansion of the factors included in measures like GDP. This expansion is called resource accounting or environmental accounting. The recent attention to environmental quality issues has rekindled that interest. We can measure environmental impacts in physical terms (tons of fish harvested, cubic metres of wood, tons of pollutants); the challenge is to translate at least some of these measures into monetary terms that can be directly incorporated in economic decision making.

From a strict accounting perspective, natural resources such as old growth forests and ore deposits are not considered to be of value until they are developed. Once the timber is logged or the ore mined, this resource development appears as an economic benefit to the province. But no provincial accounting procedure records that the province's inventory of timber and copper ore has been depleted. This reduction in assets simply is not considered. Similarly, an improvement to the resource base, such as reforestation, is not recorded as an asset. In a resource dependent economy like ours, we should probably be attempting to integrate natural resource accounts into the Provincial Accounting System for the sectors of forestry, mining/petroleum, agriculture, fish, wildlife and hydro-electricity.

It should be noted that many resource-based businesses such as logging companies have long recognized as assets the environmental resources that their operations depend on and as such have incorporated them in their financial accounting. The need is for this approach to also be applied at the provincial accounting level.

Environmental resource accounting has the potential to feed directly into State of Environment Reporting (SOE). An SOE Report might include:

- performance of natural resource sectors reported in physical and monetary terms;
- non-market environmental quality values described in physical terms and compiled into easily understood, meaningful environmental quality indicators;
- environmental stocks and trends;
- the natural processes and human activities affecting those conditions and trends; and
- management programs for responding to environmental concerns.

A number of countries have implemented measures that consider resource and environmental performance as either supplements to GDP statistics or factors that are rolled into GNP data. Japan, France, Norway, and other developed nations have all made efforts in this direction. These efforts differ in what is considered in the resource performance measures and how they relate to the GDP statistics, but they all work towards incorporating environmental information into economic performance measures.

One developing country with a resource-based economy somewhat similar to British Columbia's is Indonesia. There, a framework was developed that allowed analysts to adjust the gross domestic output statistics to consider depletion of the forest resource base through soil erosion or conversion of forest land to farm land, activities that permanently remove land from the forest resource base. The data indicate that roughly half the average annual increase in GDP in Indonesia during the period 1971-1984 was accounted for by depletion of the natural resource base.

Recent writing on environmental accounting has stressed that there is no single "right" way to progress from standard GNP statistics to measures that also reflect environmental performance. Perhaps the best starting point is to consider that the task at hand is to provide information for better decision making. In that vein, attention should be focused on the kinds of tradeoffs that arise in decision making and how indices of economic environmental performance can be constructed to provide insight about these tradeoffs.

Are steps toward a comprehensive system of resource accounting needed in British Columbia? How do we get started?

In the near term, the best place to start may be with a single sector, such as the forest . Two steps would be needed: 1. breakout the forest sector from existing provincial GDP accounts, a step which could be readily accomplished; and 2. develop an index of forest health. Such an index could be accomplished on the basis of interviews with experts to establish measures that are important in judging resource performance in this context. The result would be two combined indices that could be used to provide information regarding the status of the provincial forest economy and the provincial forest resource.

Two important future steps would be to:

(1) Consider the possibility of regionalizing these indicators of resource health. There are many resource decisions that are made at the municipal and regional levels. By developing indicators of resource performance at that level, direct feedback would be provided to local governments regarding issues such as the implications for population growth, economic development, and resource use policies.

(2) A comprehensive structure or "index" for assessing environmental performance throughout the British Columbia economy is eventually needed. Such an index could be combined with an index of social performance, which would consider factors such as literacy, family and community health, as well as a broadened index of economic performance, which would include GNP and other factors as well. If such a system of accounts were developed, British Columbia would be a leader in developing broadly based measures of economic, social and environmental performance.

CONCLUSION

Various instruments will be needed to help implement a sustainable development strategy for British Columbia. These instruments should help resolve current issues and hopefully will make it easier for all of us to achieve a sustainable future. The Round Table has found that economic instruments are frequently mentioned during its discussions of major themes, such as energy, communities, and land and water use. It has also found that economic instruments are being used increasingly in other countries in their attempts to achieve sustainability. As a consequence, the Round Table would like to hear what British Columbians think about them and what ideas there are for their possible use here.

This theme paper discusses market incentives and resource accounting as two of the economic tools that could be used. They are mechanisms that help people make decisions by placing dollar values on environmental resources. They tend to promote positive action toward sustainability, and perhaps offer a useful alternative to regulations and fines. Indeed the optimum set of incentives may be a mix of both the "carrot" and the "stick".

Some of these instruments are being used now in British Columbia. Should we be using them more? If so, how should we go about doing it? Please let us know what you think.

HOW YOU CAN GET INVOLVED

The British Columbia Round Table on the Environment and the Economy welcomes your comments on this paper, either in writing or at a public meeting. Please feel free to tell us your views on the issues raised in the search for a sustainable development strategy for British Columbia.

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Available Theme Papers

Sustainable Land and Water Use
Sustainable Communities
Sustainable Energy
Sustainable Development and Economic Instruments

Available Background Papers

Decision processes for land allocation
Analytical methods for land allocation
Water allocation and management
Population changes
Air quality issues
Municipal water issues
Waste management issues
The British Columbia economy
Economic incentives
Resource accounting
Energy development processes
Transboundary issues